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Knuth, Alexander
Old, Lloyd
Chen, Yao-tseng

<120> Isolated Nucleic Acid Molecules Encoding Cancer Associated Antigens,
the Antigens per se, and Uses Thereof

<130> LUD 5615.1

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<151> 1999-11-30

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35 40 45

Lys Glu Leu Asp Glu Cys Tyr Glu Arg Phe Ser Arg Glu Thr Asp Gly
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Ala Gln Lys Arg Arg Met Leu His Cys Val Gln Arg Ala Leu Ile Arg
65 70 75 80

Ser Gln Glu Leu Gly Asp Glu Lys Ile Gln Ile Val Ser Gln Met Val
85 90 95

Glu Leu Val Glu Asn Arg Thr Arg Gln Val Asp Ser His Val Glu Leu
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Phe Glu Ala Gln Gln Glu Leu Gly Asp Thr Val Gly Asn Ser Gly Lys
115 120 125

Val Gly Ala Asp Arg Pro Asn Gly Asp Ala Val Ala Gln Ser Asp Lys
130 135 140

Pro Asn Ser Lys Arg Ser Arg Arg Gln Arg Asn Asn Glu Asn Arg Glu
145 150 155 160

Asn Ala Ser Ser Asn His Asp His Asp Asp Gly Ala Ser Gly Thr Pro
165 170 175

Lys Glu Lys Lys Ala Lys Thr Ser Lys Lys Lys Lys Arg Ser Lys Ala
180 185 190

Lys Ala Glu Arg Glu Ala Ser Pro Ala Asp Leu Pro Ile Asp Pro Asn
195 200 205

Glu Pro Thr Tyr Cys Leu Cys Asn Gln Val Ser Tyr Gly Glu Met Ile
210 215 220

Gly Cys Asp Asn Asp Glu Cys Pro Ile Glu Trp Phe His Phe Ser Cys
225 230 235 240

Val Gly Leu Asn His Lys Pro Lys Gly Lys Trp Tyr Cys Pro Lys Cys
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Arg Gly Glu Asn Glu Lys Thr Met Asp Lys Ala Leu Glu Lys Ser Lys
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Lys Glu Arg Ala Tyr Asn Arg
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Arg Thr Arg Gln Val Asp Ser His Val Glu Leu Phe Glu Ala Gln Gln
35 40 45

Glu Leu Gly Asp Thr Val Gly Asn Ser Gly Lys Val Gly Ala Asp Arg
50 55 60

Pro Asn Gly Asp Ala Val Ala Gln Ser Asp Lys Pro Asn Ser Lys Arg
65 70 75 80

Ser Arg Arg Gln Arg Asn Asn Glu Asn Arg Glu Asn Ala Ser Ser Asn
85 90 95

His Asp His Asp Asp Gly Ala Ser Gly Thr Pro Lys Glu Lys Lys Ala
100 105 110

Lys Thr Ser Lys Lys Lys Lys Arg Ser Lys Ala Lys Ala Glu Arg Glu
115 120 125

Ala Ser Pro Ala Asp Leu Pro Ile Asp Pro Asn Glu Pro Thr Tyr Cys
130 135 140

Leu Cys Asn Gln Val Ser Tyr Gly Glu Met Ile Gly Cys Asp Asn Asp
145 150 155 160

Glu Cys Pro Ile Glu Trp Phe His Phe Ser Cys Val Gly Leu Asn His
165 170 175

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Ala Leu Ile Arg Ser Gln Glu Leu Gly Asp Glu Lys Ile Gln Ile Val
35 40 45

Ser Gln Met Val Glu Leu Val Glu Asn Arg Thr Arg Gln Val Asp Ser
50 55 60

His Val Glu Leu Phe Glu Ala Gln Gln Glu Leu Gly Asp Thr Val Gly
65 70 75 80

Asn Ser Gly Lys Val Gly Ala Asp Arg Pro Asn Gly Asp Ala Val Ala
85 90 95

Gln Ser Asp Lys Pro Asn Ser Lys Arg Ser Arg Arg Gln Arg Asn Asn
100 105 110

Glu Asn Arg Glu Asn Ala Ser Ser Asn His Asp His Asp Asp Gly Ala
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Ser Gly Thr Pro Lys Glu Lys Lys Ala Lys Thr Ser Lys Lys Lys Lys

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Gly Glu Met Ile Gly Cys Asp Asn Asp Glu Cys Pro Ile Glu Trp Phe		
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His Phe Ser Cys Val Gly Leu Asn His Lys Pro Lys Gly Lys Trp Tyr		
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 35 40 45

Glu Gln Thr Leu Arg Ala Asp Glu Ile Leu Pro Ser Glu Ser Lys Gln
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Lys Asp Tyr Glu Glu Ser Ser Trp Asp Ser Glu Ser Leu Cys Glu Thr
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Val Ser Gln Lys Asp Val Cys Leu Pro Lys Ala Thr His Gln Lys Glu
 85 90 95

Ile Asp Lys Ile Asn Gly Lys Leu Glu Glu Ser Pro Asp Asn Asp Gly
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 Phe Leu Lys Ala Pro Cys Arg Met Lys Val Ser Ile Pro Thr Lys Ala
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 Leu Glu Leu Met Asp Met Gln Thr Phe Lys Ala Glu Pro Pro Glu Lys
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 Pro Ser Ala Phe Glu Pro Ala Ile Glu Met Gln Lys Ser Val Pro Asn
 145 150 155 160
 Lys Ala Leu Glu Leu Lys Asn Glu Gln Thr Leu Arg Ala Asp Gln Met
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 Phe Pro Ser Glu Ser Lys Gln Lys Lys Val Glu Glu Asn Ser Trp Asp
 180 185 190
 Ser Glu Ser Leu Arg Glu Thr Val Ser Gln Lys Asp Val Cys Val Pro
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 Lys Ala Thr His Gln Lys Glu Met Asp Lys Ile Ser Gly Lys Leu Glu
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 Asp Ser Thr Ser Leu Ser Lys Ile Leu Asp Thr Val His Ser Cys Glu
 225 230 235 240
 Arg Ala Arg Glu Leu Gln Lys Asp His Cys Glu Gln Arg Thr Gly Lys
 245 250 255
 Met Glu Gln Met Lys Lys Lys Phe Cys Val Leu Lys Lys Lys Leu Ser
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 Glu Gln Glu Leu Cys Ser Val Arg Leu Thr Leu Asn Gln Glu Glu Glu
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 Lys Arg Arg Asn Ala Asp Ile Leu Asn Glu Lys Ile Arg Glu Glu Leu
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 340 345 350
 Ser Asn Leu Asn Gln Val Ser His Thr His Glu Asn Glu Asn Tyr Leu
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 385 390 395 400
 Phe Glu Asp Ile Lys Ile Leu Lys Glu Lys Asn Ala Glu Leu Gln Met
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 Thr Leu Lys Leu Lys Glu Glu Ser Leu Thr Lys Arg Ala Ser Gln Tyr
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 Ser Gly Gln Leu Lys Val Leu Ile Ala Glu Asn Thr Met Leu Thr Ser
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Lys Leu Lys Glu Lys Gln Asp Lys Glu Ile Leu Glu Ala Glu Ile Glu
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Ser His His Pro Arg Leu Ala Ser Ala Val Gln Asp His Asp Gln Ile
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Gln Glu Leu Gly Asp Glu Lys Ile Gln Ile Val Ser Gln Met Val Glu
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Leu Val Glu Asn Arg Thr Arg Gln Val Asp Ser His Val Glu Leu Phe
115 120 125

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130 135 140

Gly Ala Asp Arg Pro Asn Gly Asp Ala Val Ala Gln Ser Asp Lys Pro
145 150 155 160

Asn Ser Lys Arg Ser Arg Arg Gln Arg Asn Asn Glu Asn Arg Glu Asn
165 170 175

Ala Ser Ser Asn His Asp His Asp Asp Gly Ala Ser Gly Thr Pro Lys
180 185 190

Glu Lys Lys Ala Lys Thr Ser Lys Lys Lys Arg Ser Lys Ala Lys
195 200 205

Ala Glu Arg Glu Ala Ser Pro Ala Asp Leu Pro Ile Asp Pro Asn Glu
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Pro Thr Tyr Cys Leu Cys Asn Gln Val Ser Tyr Gly Glu Met Ile Gly
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Cys Asp Asn Asp Glu Cys Pro Ile Glu Trp Phe His Phe Ser Cys Val
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Gly Leu Asn His Lys Pro Lys Gly Lys Trp Tyr Cys Pro Lys Cys Arg
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 35 40 45

Glu His Arg Thr Pro Leu Met Lys Ala Leu Gln Cys His Gln Glu Ala
 50 55 60

Cys Ala Asn Ile Leu Ile Asp Ser Gly Ala Asp Ile Asn Leu Val Asp

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Val Tyr Gly Asn Met Ala Leu His Tyr Ala Val Tyr Ser Glu Ile Leu						
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Ser Val Val Ala Lys Leu Leu Ser His Gly Ala Val Ile Glu Val His						
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Asn Lys Ala Ser Leu Thr Pro Leu Leu Ser Ile Thr Lys Arg Ser						
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Glu Gln Ile Val Glu Phe Leu Leu Ile Lys Asn Ala Asn Ala Asn Ala						
	130		135		140	
Val Asn Lys Tyr Lys Cys Thr Ala Leu Met Leu Ala Val Cys His Gly						
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Ser Ser Glu Ile Val Gly Met Leu Leu Gln Gln Asn Val Asp Val Phe						
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Ala Ala Asp Ile Cys Gly Val Thr Ala Glu His Tyr Ala Val Thr Cys						
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Gly Phe His His Ile His Glu Gln Ile Met Glu Tyr Ile Arg Lys Leu						
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Ser Lys Asn His Gln Asn Thr Asn Pro Glu Gly Thr Ser Ala Gly Thr						
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Pro Asp Glu Ala Ala Pro Leu Ala Glu Arg Thr Pro Asp Thr Ala Glu						
	225		230		235	240
Ser Leu Val Glu Lys Thr Pro Asp Glu Ala Ala Pro Leu Val Glu Arg						
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Thr Pro Asp Thr Ala Glu Ser Leu Val Glu Lys Thr Pro Asp Glu Ala						
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Ala Ser Leu Val Glu Gly Thr Ser Asp Lys Ile Gln Cys Leu Glu Lys						
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Ala Thr Ser Gly Lys Phe Glu Gln Ser Ala Glu Glu Thr Pro Arg Glu						
	290		295		300	
Ile Thr Ser Pro Ala Lys Glu Thr Ser Glu Lys Phe Thr Trp Pro Ala						
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Lys Gly Arg Pro Arg Lys Ile Ala Trp Glu Lys Lys Glu Asp Thr Pro						
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Arg Glu Ile Met Ser Pro Ala Lys Glu Thr Ser Glu Lys Phe Thr Trp						
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Pro Val Lys Thr Gly Cys Val Ala Arg Val Thr Ser Asn Lys Thr Lys						
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Val Leu Glu Lys Gly Arg Ser Lys Met Ile Ala Cys Pro Thr Lys Glu						
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Ser Ser Thr Lys Ala Ser Ala Asn Asp Gln Arg Phe Pro Ser Glu Ser						
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Lys Gln Glu Glu Asp Glu Glu Tyr Ser Cys Asp Ser Arg Ser Leu Phe						
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 Lys Val Met Glu Ile Asn Arg Glu Val Glu Glu Pro Pro Lys Lys Pro
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 Ser Ala Phe Lys Pro Ala Ile Glu Met Gln Asn Ser Val Pro Asn Lys
 465 470 475 480
 Ala Phe Glu Leu Lys Asn Glu Gln Thr Leu Arg Ala Asp Pro Met Phe
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 Pro Pro Glu Ser Lys Gln Lys Asp Tyr Glu Glu Asn Ser Trp Asp Ser
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 Glu Ser Leu Cys Glu Thr Val Ser Gln Lys Asp Val Cys Leu Pro Lys
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 Ala Thr His Gln Lys Glu Ile Asp Lys Ile Asn Gly Lys Leu Glu Glu
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 Ser Pro Asn Lys Asp Gly Leu Leu Lys Ala Thr Cys Gly Met Lys Val
 545 550 555 560
 Ser Ile Pro Thr Lys Ala Leu Glu Leu Lys Asp Met Gln Thr Phe Lys
 565 570 575
 Ala Glu Pro Pro Gly Lys Pro Ser Ala Phe Glu Pro Ala Thr Glu Met
 580 585 590
 Gln Lys Ser Val Pro Asn Lys Ala Leu Glu Leu Lys Asn Glu Gln Thr
 595 600 605
 Trp Arg Ala Asp Glu Ile Leu Pro Ser Glu Ser Lys Gln Lys Asp Tyr
 610 615 620
 Glu Glu Asn Ser Trp Asp Thr Glu Ser Leu Cys Glu Thr Val Ser Gln
 625 630 635 640
 Lys Asp Val Cys Leu Pro Lys Ala Ala His Gln Lys Glu Ile Asp Lys
 645 650 655
 Ile Asn Gly Lys Leu Glu Gly Ser Pro Val Lys Asp Gly Leu Leu Lys
 660 665 670
 Ala Asn Cys Gly Met Lys Val Ser Ile Pro Thr Lys Ala Leu Glu Leu
 675 680 685
 Met Asp Met Gln Thr Phe Lys Ala Glu Pro Pro Glu Lys Pro Ser Ala
 690 695 700
 Phe Glu Pro Ala Ile Glu Met Gln Lys Ser Val Pro Asn Lys Ala Leu
 705 710 715 720
 Glu Leu Lys Asn Glu Gln Thr Leu Arg Ala Asp Glu Ile Leu Pro Ser
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 Glu Ser Lys Gln Lys Asp Tyr Glu Glu Ser Ser Trp Asp Ser Glu Ser
 740 745 750
 Leu Cys Glu Thr Val Ser Gln Lys Asp Val Cys Leu Pro Lys Ala Thr
 755 760 765
 His Gln Lys Glu Ile Asp Lys Ile Asn Gly Lys Leu Glu Glu Ser Pro
 770 775 780
 Asp Asn Asp Gly Phe Leu Lys Ala Pro Cys Arg Met Lys Val Ser Ile

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Pro Pro Glu Lys	Pro Ser Ala Phe	Glu Pro Ala Ile	Glu Met Gln Lys
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Ala Asp Gln Met	Phe Pro Ser Glu	Ser Lys Gln Lys	Lys Val Glu Glu
	850	855	860
Asn Ser Trp Asp	Ser Glu Ser Leu	Arg Glu Thr Val	Ser Gln Lys Asp
	865	870	875
Val Cys Val Pro	Lys Ala Thr His	Gln Lys Glu Met	Asp Lys Ile Ser
	885	890	895
Gly Lys Leu Glu	Asp Ser Thr Ser	Leu Ser Lys Ile	Leu Asp Thr Val
	900	905	910
His Ser Cys Glu	Arg Ala Arg Glu	Leu Gln Lys Asp	His Cys Glu Gln
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Arg Thr Gly Lys	Met Glu Gln Met	Lys Lys Lys Phe	Cys Val Leu Lys
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Lys Val Lys Trp	Glu Gln Glu Leu	Cys Ser Val Arg	Leu Thr Leu Asn
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Arg Glu Glu Leu	Gly Arg Ile Glu	Glu Gln His Arg	Lys Glu Leu Glu
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Val Lys Gln Gln	Leu Glu Gln Ala	Leu Arg Ile Gln	Asp Ile Glu Leu
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Lys Ser Val Glu	Ser Asn Leu Asn	Gln Val Ser His	Thr His Glu Asn
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Glu Asn Tyr Leu	Leu His Glu Asn	Cys Met Leu Lys	Lys Glu Ile Ala
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Met Leu Lys Leu	Glu Ile Ala Thr	Leu Lys His Gln	Tyr Gln Glu Lys
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Glu Asn Lys Tyr	Phe Glu Asp Ile	Lys Ile Leu Lys	Glu Lys Asn Ala
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Glu Leu Gln Met	Thr Leu Lys Leu	Lys Glu Glu Ser	Leu Thr Lys Arg
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Ala Ser Gln Tyr	Ser Gly Gln Leu	Lys Val Leu Ile	Ala Glu Asn Thr
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 Ser Thr Ile Tyr Asn Asn Glu Val Leu His Gln Pro Leu Ser Glu Ala
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<212> PRT

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<400> 27

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			20					25					30		

Gln	Thr	Val	Glu	Phe	Leu	Leu	Thr	Lys	Asn	Ala	Asn	Ala	Asn	Ala	Phe
	35						40					45			

Asn	Glu	Ser	Lys	Cys	Thr	Ala	Leu	Met	Leu	Ala	Ile	Cys	Glu	Gly	Ser
	50					55					60				

Ser	Glu	Ile	Val	Gly	Met	Leu	Leu	Gln	Gln	Asn	Val	Asp	Val	Phe	Ala
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Val Asn Tyr Ile His Gln Gln Leu Leu Glu His Ile Arg Lys Leu Pro						
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Lys Asn Pro Gln Asn Thr Asn Pro Glu Gly Thr Ser Thr Gly Thr Pro						
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Asp Glu Ala Ala Pro Leu Ala Glu Arg Thr Pro Asp Thr Ala Glu Ser						
	130			135		140
Leu Leu Glu Lys Thr Pro Asp Glu Ala Ala Arg Leu Val Glu Gly Thr						
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Ser Ala Lys Ile Gln Cys Leu Gly Lys Ala Thr Ser Gly Lys Phe Glu						
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Gln Ser Thr Glu Glu Thr Pro Arg Lys Ile Leu Arg Pro Thr Lys Glu						
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Thr Ser Glu Lys Phe Ser Trp Pro Ala Lys Glu Arg Ser Arg Lys Ile						
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Val Thr Pro Asn Lys Thr Glu Val Leu Glu Lys Gly Thr Ser Asn Met						
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Asp Val Ser Ser Val Glu Pro Ile Phe Ser Leu Phe Gly Thr Arg Thr						
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Ile Glu Asn Ser Gln Cys Thr Lys Val Glu Glu Asp Phe Asn Leu Ala						
	275			280		285
Thr Lys Ile Ile Ser Lys Ser Ala Ala Gln Asn Tyr Thr Cys Leu Pro						
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Asp Ala Thr Tyr Gln Lys Asp Ile Lys Thr Ile Asn His Lys Ile Glu						
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Asp Gln Met Phe Pro Ser Glu Ser Lys Arg Glu Glu Asp Glu Glu Tyr						
	325			330		335
Ser Trp Asp Ser Gly Ser Leu Phe Glu Ser Ser Ala Lys Thr Gln Val						
	340			345		350
Cys Ile Pro Glu Ser Met Tyr Gln Lys Val Met Glu Ile Asn Arg Glu						
	355			360		365
Val Glu Glu Leu Pro Glu Lys Pro Ser Ala Phe Lys Pro Ala Val Glu						
	370			375		380
Met Gln Lys Thr Val Pro Asn Lys Ala Phe Glu Leu Lys Asn Glu Gln						
	385			390		395
Thr Leu Arg Ala Ala Gln Met Phe Pro Ser Glu Ser Lys Gln Lys Asp						
	405			410		415
Asp Glu Glu Asn Ser Trp Asp Ser Glu Ser Pro Cys Glu Thr Val Ser						
	420			425		430

Gln Lys Asp Val Tyr Leu Pro Lys Ala Thr His Gln Lys Glu Phe Asp
 435 440 445
 Thr Leu Ser Gly Lys Leu Glu Glu Ser Pro Val Lys Asp Gly Leu Leu
 450 455 460
 Lys Pro Thr Cys Gly Arg Lys Val Ser Leu Pro Asn Lys Ala Leu Glu
 465 470 475 480
 Leu Lys Asp Arg Glu Thr Phe Lys Ala Glu Ser Pro Asp Lys Asp Gly
 485 490 495
 Leu Leu Lys Pro Thr Cys Gly Arg Lys Val Ser Leu Pro Asn Lys Ala
 500 505 510
 Leu Glu Leu Lys Asp Arg Glu Thr Leu Lys Ala Glu Ser Pro Asp Asn
 515 520 525
 Asp Gly Leu Leu Lys Pro Thr Cys Gly Arg Lys Val Ser Leu Pro Asn
 530 535 540
 Lys Ala Leu Glu Leu Lys Asp Arg Glu Thr Phe Lys Ala Ala Gln Met
 545 550 555 560
 Phe Pro Ser Glu Ser Lys Gln Lys Asp Asp Glu Glu Asn Ser Trp Asp
 565 570 575
 Phe Glu Ser Phe Leu Glu Thr Leu Leu Gln Asn Asp Val Cys Leu Pro
 580 585 590
 Lys Ala Thr His Gln Lys Glu Phe Asp Thr Leu Ser Gly Lys Leu Glu
 595 600 605
 Glu Ser Pro Asp Lys Asp Gly Leu Leu Lys Pro Thr Cys Gly Met Lys
 610 615 620
 Ile Ser Leu Pro Asn Lys Ala Leu Glu Leu Lys Asp Arg Glu Thr Phe
 625 630 635 640
 Lys Ala Glu Asp Val Ser Ser Val Glu Ser Thr Phe Ser Leu Phe Gly
 645 650 655
 Lys Pro Thr Thr Glu Asn Ser Gln Ser Thr Lys Val Glu Glu Asp Phe
 660 665 670
 Asn Leu Thr Thr Lys Glu Gly Ala Thr Lys Thr Val Thr Gly Gln Gln
 675 680 685
 Glu Arg Asp Ile Gly Ile Ile Glu Arg Ala Pro Gln Asp Gln Thr Asn
 690 695 700
 Lys Met Pro Thr Ser Glu Leu Gly Arg Lys Glu Asp Thr Lys Ser Thr
 705 710 715 720
 Ser Asp Ser Glu Ile Ile Ser Val Ser Asp Thr Gln Asn Tyr Glu Cys
 725 730 735
 Leu Pro Glu Ala Thr Tyr Gln Lys Glu Ile Lys Thr Thr Asn Gly Lys
 740 745 750
 Ile Glu Glu Ser Pro Glu Lys Pro Ser His Phe Glu Pro Ala Thr Glu
 755 760 765
 Met Gln Asn Ser Val Pro Asn Lys Gly Leu Glu Trp Lys Asn Lys Gln
 770 775 780
 Thr Leu Arg Ala Asp Ser Thr Thr Leu Ser Lys Ile Leu Asp Ala Leu

785		790		795		800
Pro Ser Cys Glu Arg Gly Arg Glu Leu Lys Lys Asp Asn Cys Glu Gln						
	805			810		815
Ile Thr Ala Lys Met Glu Gln Met Lys Asn Lys Phe Cys Val Leu Gln						
	820		825			830
Lys Glu Leu Ser Glu Ala Lys Glu Ile Lys Ser Gln Leu Glu Asn Gln						
	835		840			845
Lys Ala Lys Trp Glu Gln Glu Leu Cys Ser Val Arg Leu Pro Leu Asn						
	850		855		860	
Gln Glu Glu Glu Lys Arg Arg Asn Val Asp Ile Leu Lys Glu Lys Ile						
	865		870		875	880
Arg Pro Glu Glu Gln Leu Arg Lys Lys Leu Glu Val Lys His Gln Leu						
		885		890		895
Glu Gln Thr Leu Arg Ile Gln Asp Ile Glu Leu Lys Ser Val Thr Ser						
	900		905			910
Asn Leu Asn Gln Val Ser His Thr His Glu Ser Glu Asn Asp Leu Phe						
	915		920			925
His Glu Asn Cys Met Leu Lys Lys Glu Ile Ala Met Leu Lys Leu Glu						
	930		935		940	
Val Ala Thr Leu Lys His Gln His Gln Val Lys Glu Asn Lys Tyr Phe						
	945		950		955	960
Glu Asp Ile Lys Ile Leu Gln Glu Lys Asn Ala Glu Leu Gln Met Thr						
		965		970		975
Leu Lys Leu Lys Gln Lys Thr Val Thr Lys Arg Ala Ser Gln Tyr Arg						
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